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EXAMINER

KINNEY, ANNA L

ART UNIT PAPER NUMBER

1731

DATE MAILED: 05/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/770,474

Applicant(s)

HU ET AL.

Examiner

Anna Kinney

Art Unit

1731

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 and 34 is/are pending in the application.
- 4a) Of the above claim(s) 2-5 and 10-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 6-9, 14, 16-25 and 34 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Election/Restrictions

As noted in the previous Office Action, claims 2-5, 12, and 13 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Furthermore, applicant's Remarks (pg. 9, last ¶) indicate that Y1 and Y2 are both absent from the phosphine compounds. Since applicant elected the species in which Y1 and Y2 are both present, claims 10 and 11 are also withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on November 24, 2005.

Response to Arguments

Applicant's arguments, see Remarks, paragraph bridging pgs. 12-13, filed February 13, 2006, with respect to the rejection(s) of claim(s) 1, 6-11, 14-25, and 34 under 35 USC 102(b) and 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Sharifian et al (U.S. Patent 4,904,357) and Davidson (R. S. Davidson et al, A Study of the Photoyellowing of Paper Made from Bleached CTMP, Journal of Wood Chemistry and Technology, 11(4), 419-437, 1991; provided by applicant).

Claim Objections

Claim 24 is objected to because of the following informalities: The Examiner notes a spelling error; the compound name for DTPA does not have an "o" in it. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 6-11, 14-25, and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1, 6, 7, 18, 19, and 24, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claims 21-23 and 25 recite the limitation "the treatment" or "said treating" in the first line of each claim. There is insufficient antecedent basis for this limitation in the claim. Claim 1 recites the limitation "bleaching" in the 2nd line of the claim, and the limitation "stabilizing" in the 2nd to last line of the claim. The Examiner notes that these could indicate two treatment steps. The limitations of claims 21-23 and 25 do not indicate which step is intended, or if both bleaching and stabilizing are performed in a single treatment. The Examiner also notes that the term "the molecule" in lines 19-20 does not have clear antecedent basis in the claim. For purposes of examination, the

Art Unit: 1731

Examiner construes the term to mean the compound of formula (A), rather than the lignocellulosic material.

Claim 23 recites the limitation "the pulp" in line 4 of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 1 does not recite pulp, but rather lignocellulosic material.

Claim 1 is indefinite because the limitations from the 7th to 15th lines of the claim do not appear to be complete. The Examiner can find no clear link between these limitations and the rest of the claim. In addition, the limitations of lines 16-17 of the claim contradict the depiction of formula (A) in line 4 of the claim. As written, Formula (A) provides no indication that if $y = 1$ and $n = z = m = 0$, Y1 will not be present. In fact, doing so would leave the compound with a charge imbalance. Finally, applicant has elected the species where $t = 0$, and has also elected the species in which Y1 and Y2 are both present. As written, formula (A) in line 4 of the claim indicates that if $t = 0$, Y2 cannot be present.

Claim 15 is indefinite because a functional group appears to be missing from the recited compound, and because as written, this compound contradicts the limitations of claim 1, lines 16-17.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1, 6, 7, 9, 16, 18, 20-23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharifian et al (U.S. Patent 4,904,357) in view of Davidson (R. S. Davidson et al, A Study of the Photoyellowing of Paper Made from Bleached CTMP, Journal of Wood Chemistry and Technology, 11(4), 419-437, 1991; provided by applicant).

With respect to claim 1, Sharifian et al discloses a method of bleaching of a lignocellulosic material comprising bleaching the lignocellulosic material (col. 5, lines 41-43) with a water-soluble phosphonium compound (col. 1, lines 40-55; col. 5, lines 38-43) of formula (A), wherein $t = 0$, $R_4R_5PY_2$ is absent, and R_3 is bonded to the P of the $R_1R_2PY_1$ group (col. 2, line 10), wherein X is present and is an organic anion, Y_1 is a hydroxymethyl group, R_1 , R_2 , and R_3 are independently selected from a Lewis acid (e.g., BH_4^-), linear or branched alkyl groups, or aryl groups (col. 2, lines 10-39).

Sharifian does not disclose expressly stabilizing brightness, or the solubility of the molecule (the Examiner construes this to refer to the compound of formula (A)).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the compound of Sharifian would intrinsically have the same solubility as the compound of formula (A), since they share the same functional groups bound to a P atom.

Davidson discloses a method of brightness stabilization of a lignocellulosic material comprising bleaching the lignocellulosic material (pg. 419, Abstract) with a water-soluble phosphonium compound, THPC (pg. 422, Table 1, row 11) of formula (A), wherein t is zero, R_3 is bonded to the P of the $R_1R_2PY_1$ group, $R_4R_5PY_2$ is absent, X

is present and is an inorganic ion, and R1, R2, R3, and Y1 are hydroxymethyl groups, stabilizing the brightness in the resulting bleached lignocellulosic material with said compound of formula A (pg. 422, Table 1, row 11).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use expect brightness stabilization as described by Davidson from the phosphonium of Sharifian to obtain the invention as specified in claim 1.

The suggestion would have been that it is a source of a tervalent phosphorus compound which is able to reduce peroxidic species (pg. 431, lines 8-15) and thus destroy peroxidic species which may lie along the reaction pathways leading to the coloured species of lignin (pg. 430, 1st ¶).

With respect to claims 6, 7, and 9, Sharifian and Davidson are applied as in the rejection to claim 1, above.

With respect to claims 16, 18, and 20, Sharifian does not disclose expressly what type of paper pulp is bleached.

With respect to claim 16, Davidson discloses a mechanical wood pulp (i.e., CTMP; pg. 419, Abstract, lines 1-4).

With respect to claim 18, Davidson discloses a mechanical wood pulp that has been bleached with other bleaching chemicals (pg. 421, lines 12-14).

With respect to claim 20, Davidson discloses that the lignocellulosic material is a paper sheet containing mechanical wood pulp (pg. 421, lines 12-14).

With respect to claims 21-23 and 25, Sharifian does not disclose expressly the conditions under which or vessel in which bleaching occurs.

With respect to claims 21 and 22, Davidson discloses that the bleaching and stabilization is conducted in an aqueous medium (pg. 432, 2nd full ¶) for 24-100 hours (pg. 422, Table 1), which contains 2 specific points within the claimed range of 5 minutes to 30 days, with a charge of the phosphorus compound being a 2% solution, which the Examiner presumes would provide a charge within the claimed range of 0.01 to 6.0% by weight, based on the oven-dry weight of the lignocellulosic material.

Sharifian discloses that the solubility of a compound of formula (A) is affected by changing the temperature of the solution (col. 9, lines 44-51).

At the time of the invention, absent a showing of unexpected results, it would have been obvious to a person of ordinary skill in the art to optimize the temperature, pH of the solution and the consistency of the lignocellulosic material to achieve the necessary solubility and application rate of the compound. Furthermore, the wide ranges claimed indicates a lack of criticality. It has been held that discovering the optimum or workable ranges or an optimum value of a result effective variable involves only routine skill in the art. See MPEP 2144.05 II.

With respect to claim 23, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an appropriate vessel to contain the lignocellulosic material and compound during bleaching and stabilization.

With respect to claim 25, Davidson is applied as in the rejection to claims 21 and 22, above.

Claims 8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharifian and Davidson as applied to claim 1 above, and further in view of Bowdery et al (WO 01/53602 A1).

With respect to claim 8, Sharifian and Davidson do not disclose expressly that X is sulfate.

Bowdery discloses treating pulp with a phosphonium compound of formula (A) (paragraph bridging pgs. 1-2), and indicates the alternativeness of a chloride or a sulfate salt (pg. 2, lines 5-9).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a sulfate THP salt as described by Bowdery in the bleaching process of Sharifian and Davidson to obtain the invention as specified in claim 8.

The motivation would have been that by consuming hydrogen peroxide, catalase can lower bleaching efficiency and decrease brightness levels of finished paper (pg. 1, ¶ 2), THP salts are more effective than glutaraldehyde at killing catalase-producing bacteria and can be used to chemically destroy catalase (pg. 1, ¶s 5-6), and THPS is the preferred THP salt (pg. 2, lines 5-6).

With respect to claim 14, Bowdery is applied as in the rejection to claim 8, above.

Claims 17, 19, 24, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharifian in view of Davidson as applied to claims 1 and 16 above, and further in view of Liebergott et al (U.S. Patent 4,804,440).

With respect to claim 17, Sharifian and Davidson do not disclose expressly furnish.

Art Unit: 1731

Liebergott discloses bleaching lignocellulosic material that is mechanical wood pulp, chemical wood pulp (col. 2, lines 1-6), and also discloses spruce expressly (col. 8, lines 22-25 and col. 5, lines 23-28).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the bleaching process of Sharifian and Davidson to the furnish of Liebergott to obtain the invention as specified in claim 17.

The motivation would have been to give high brightness levels to high-yield and ultra high-yield pulps (col. 1, lines 59-61).

With respect to claim 19, Sharifian and Davidson do not disclose expressly that the lignocellulosic material is chemical wood pulp.

Liebergott is applied as in the rejection to claim 17.

With respect to claims 24 and 34, Sharifian and Davidson do not disclose expressly adding a yellowing inhibitor or chelating agent or additional bleaching.

Liebergott discloses adding an organic chelating agent to remove naturally occurring trace metals (col. 1, lines 21-25) and discloses that two stage bleaching with dithionite in the second stage is well known and applied commercially (col. 1, lines 38-41).

Allowable Subject Matter

Claim 15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: the primary reason for allowance is the limitation requiring bleaching and brightness stabilization using 3-[tris(hydroxymethyl)phosphonium]propionate.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Kinney whose telephone number is (571) 272-8388. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ALK


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